

## CLAIMS:

1. A bipolar separator for a fuel cell stack, comprising a cathode sheet and an anode sheet, at least one of said sheets provided with fluid passage holes, wherein said sheets are welded or metallurgically bonded through at least one corrugated conductive element and said sheets delimit a passage section of a cooling fluid.
2. The separator of claim 1, wherein said fluid passage holes are gas feed and/or discharge holes disposed in one or more peripheral regions of said at least one sheet.
3. The separator of claim 1 or 2 wherein said fluid passage holes comprise calibrated orifices for feeding a flow of said cooling fluid to the fuel cells.
4. The separator of any one of claims 1 to 3 wherein said at least one corrugated conductive element adjoins said cathode and anode sheets generally along the whole surface of the separator and said cooling fluid passage section comprises channels delimited by the surface of said corrugated conductive element.
5. The separator of any one of claims 1 to 3 wherein said at least one corrugated conductive element adjoins said cathode and anode sheets only in one or more peripheral regions of the separator.
6. The separator of claim 5 wherein said cooling fluid passage section comprises at least one reticulated element interposed between said cathode sheet and said anode sheet.
7. The separator of claim 6 wherein said at least one reticulated element is an electrically conductive, optionally metallic element.
8. The separator of claim 7 wherein said at least one conductive reticulated element is selected from the group consisting of metal foams, metal meshes, expanded sheets and sintered metallic materials.
9. The separator of any one of the previous claims wherein at least one of said anode and cathode sheets comprises a sealing gasket secured to the side opposite to the one whereto said corrugated conductive element is welded or metallurgically bonded.
10. The separator of any one of the previous claims wherein at least one of

said anode and cathode sheets comprises a current collector welded or metallurgically bonded to the side opposite to the one whereto said corrugated conductive element is welded or metallurgically bonded.

11. The separator of claim 10 wherein said current collector is an electrically conductive reticulated element optionally selected from the group consisting of metal foams, metal meshes, expanded sheets and sintered metallic materials.

12. A fuel cell stack comprising at least one separator of any one of the previous claims.

13. The stack of claim 12 comprising at least one feed or discharge duct in communication with said fluid passage holes.

14. A fuel cell stack bipolar separator substantially as described making reference to the appended drawings.